

PROCEEDINGS  
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A NEW SPECIES OF *RHADINOPSYLLA* FROM THE  
REPUBLIC OF LEBANON (SIPHONAPTERA;  
HYSTRICHOPSYLLIDAE)<sup>1</sup>

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Recent collecting activities at higher elevations in the Lebanon Mountains have yielded a single specimen of a new species of *Rhadinopsylla* (*Actenophthalmus* C. Fox, 1925) from the vole *Microtus guentheri* (Danford and Alston, 1880). Attempts to obtain additional specimens were unsuccessful. A description of this new species follows. Attention is called to the excellent treatments of *Rhadinopsylla* by Smit (1957a) and Hopkins and Rothschild (1962) for additional information concerning relationships of this species to previously known forms.

***Rhadinopsylla* (*Actenophthalmus*) *hoogstraali* new species**

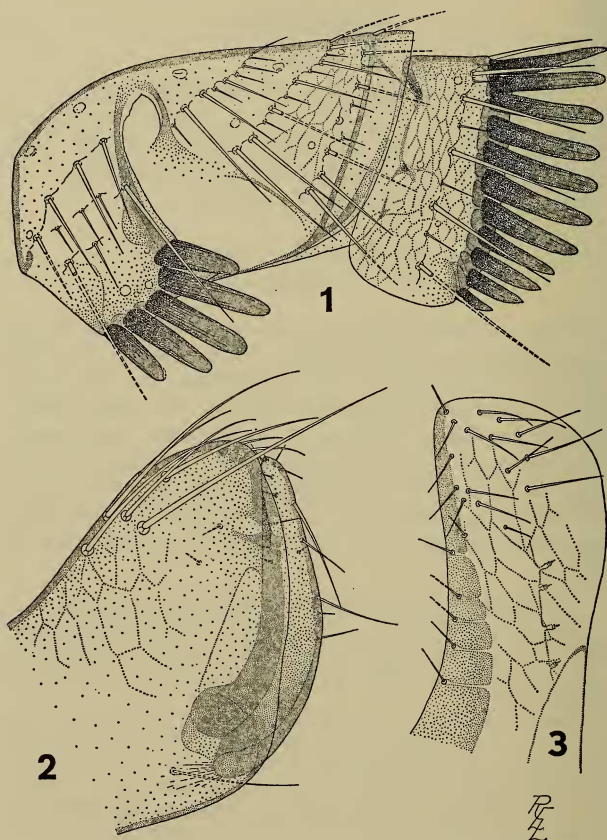
*Material*: Male holotype from south slope of Mount Sannine, about 1800 m, Republic of Lebanon, from *Microtus guentheri*, 9 May 1965, R. E. Lewis and S. I. Atallah. Deposited in the United States National Museum (USNM).

*Diagnosis*: Similar to *R. (Actenophthalmus) strouhali* Smit, 1957, from lower Austria and *R. (Actenophthalmus) bureschi* Jordan, 1929, from Bulgaria but differing from both in contours of st. VIII and IX and caudal margin of fixed process, shorter movable process, absence of acetabular bristle (possibly an abnormal condition but there is no evidence of a bristle on either side), and blunt spines of genal comb.

*Description*:

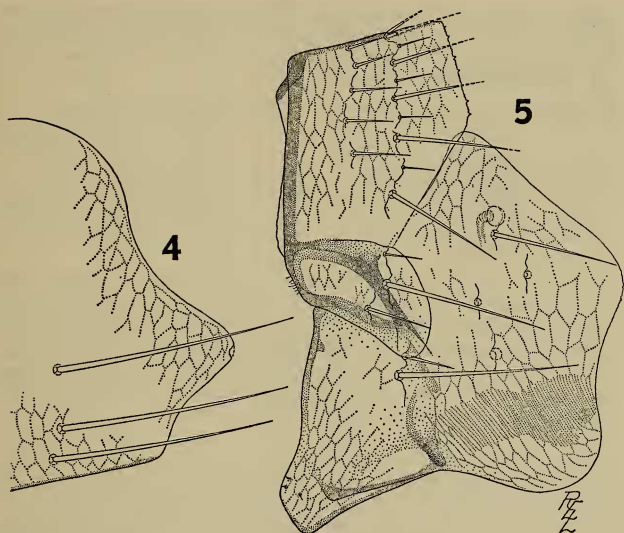
**HEAD** (Fig. 1).—Distinct frontal tubercle absent but with more or less distinct frontal angle. Genal comb of five blunt spines, uppermost broader in middle than its neighbor and extending about  $\frac{5}{8}$  length of latter. Labial palpus of five segments, extending about  $\frac{2}{3}$  length of fore coxa. Chaetotaxy as illustrated. **THORAX** (Figs. 1 and 5).—Pronotal comb of 21 spines, most slightly longer than width of pronotum.

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FIGS. 1-3. *Rhadinopsylla (Actenophthalmus) hoogstraali* new species, holotype. 1, head. 2, clasper. 3, sternum IX.

Sclerotized vertical ridge under main setal row of metanotum absent; short seta above long seta of metasternum; suture between ventral margin of metanotal collar and dorso-cephalic margin of metepimeron extending about half distance to dorso-caudal angle of metepisternum but continuing as faint, thin line. LEGS.—One seta on apex of inner side of hind femur and one on proximal end of inner side of hind tibia;



FIGS. 4-5. *Rhadinopsylla (Actenophthalmus) hoogstraali* new species, holotype. 4, sternum VIII. 5, metanotum.

longest apical seta of hind tarsal segment II extending beyond apex of segment III but not reaching middle of segment IV; fifth tarsal segment of all legs with four pairs of lateral plantar setae. ABDOMEN.—Spinelets on t. I-VI: 3/4, 3/3, 3/3, 3/3, 2/2, 1/1; one seta below spiracle on t. III-VI. MODIFIED SEGMENTS OF MALE (Figs. 2, 3 and 4).—T. VIII without bristles; st. VIII with well-developed apical lobe on caudal margin, with 3-4 long setae. Clasper, measured from tip of manubrium to apex of fixed process,  $2\frac{3}{8}$  as long as movable process. Caudal margin of fixed process convex, lacking acetabular seta (see note above). Distal arm of st. IX about  $2\frac{3}{4}$  as long as wide, apex broadly rounded caudally. Movable process not extending to apex of fixed process. Fovea of movable process situated in apical  $\frac{1}{2}$  of process. LENGTH.—2 mm.

*Remarks:* This new species is named in honor of Dr. Harry Hoogstraal, Director of Medical Zoology, United States Naval Medical Research Unit No. 3, in recognition of his major contribution to our knowledge of the fauna of Egypt and the eastern Mediterranean region.

*Discussion:* A review of the recent literature (Ioff and Scalon, 1954; Ioff, Mikulin and Scalon, 1965; Hopkins and Rothschild, 1962; Smit,

1957a and b; Peus, 1958 and Ioff and Tiflov, 1950) indicates that there are seven previously known species of the subgenus *Actenophthalmus* in the area from Lower Austria to the Volga, south to the Mediterranean Sea. Listed alphabetically they are:

R. ( <i>Act.</i> ) <i>acuminata</i>	Ioff and Tiflov, 1946	from Stavropol, Caucasus
" "	<i>buresschi</i> Jordan, 1929	" Ryla Mountains, Bulgaria
" "	<i>dolomydis</i> Smit, 1957	" Trebevic, Yugoslavia
" "	<i>mesoides</i> Smit, 1957	" Mt. Olympus, Greece
" "	<i>pilosa</i> Ioff and Tiflov, 1946	" Petrovsk District, Volga
" "	<i>sobrina</i> Peus, 1958	" Oiti Mountains, Greece
" "	<i>strouhali</i> Smit, 1957	" Lower Austria

Of these only *acuminata* and *dolomydis* are known from both sexes and at least four of the seven are known from only a single specimen. It is apparent therefore that the validity of most of these species cannot be accurately appraised until more material can be collected. It is also apparent that one of the most potentially fruitful areas, Turkey, has not yet been well investigated faunistically and is likely to yield additional new species.

In spite of the lack of material and the rather cryptic differences between the presently recognized species from southern Europe and the eastern Mediterranean region, it is still possible to construct a key, to at least the males, which should be useful to workers in this area. The following is an attempt to do so, with the full knowledge that our present lack of information about individual variation in these poorly known species imposes rather severe limitations on such an effort.

KEY TO THE SPECIES OF *RHADINOPSYLLA*  
(*ACTENOPHTHALMUS*) OF SOUTHEASTERN  
EUROPE, SOUTHWESTERN ASIA AND THE  
EASTERN MEDITERRANEAN COUNTRIES

1. Apex of st. IX of male acuminate ..... 2
- 1'. Apex of st. IX of male blunt and lobed ..... 3
2. Longest apical seta of hind tarsal segment II extending about to apex of segment IV; upper spine of genal comb broader than its lower neighbor, extending about  $\frac{2}{3}$  length of latter; pronotal comb of 20-22 spines ..... *acuminata*

*R. acuminata* also possesses one seta on the inner surface of the hind tibia. There is one bristle below the spiracle of t. III-VI. St. VIII of the male has a distinct lobe subtended by a sinus and bears an irregular row of 5-7 bristles. An acetabular seta is present and arises at the lower angle of the articulation of the movable process with the fixed process. Information is not available on the presence of the sclerotized metanotal ridge, the extent of development of the metanotal-metepimeral suture or the number of setae on the metasternum.

2. Longest apical seta of hind tarsal segment II extending almost to the apex of segment III; upper spine of genal comb equal in width to its lower neighbor, extending about  $\frac{3}{4}$  length of latter; genal spines very pointed (this information is not available for *R. acuminata*); pronotal comb of 21 spines in only known specimen ..... *mesoides*

In addition, in *R. mesoides* the sclerotized metanotal ridge is absent, there is only one seta on the metasternum and the metanotal-metepimeral suture extends to the dorso-posterior angle of the metepisternum. An acetabular seta is present, arising just below the lower point of articulation of the movable process with the fixed process. Bristles are lacking on the inner surfaces of both the hind femur and the hind tibia. One seta below the spiracle on t. III-VI. St. VIII of the male has a smoothly rounded caudal margin and a patch of five setae near its ventrocaudal angle. The caudal margin of the fixed process is mainly convex but bears a slight depression in its apical  $\frac{1}{8}$ . Apex of movable process extending to tip of fixed process.

3. Setae absent from inner surfaces of both hind femur and hind tibia; longest apical bristle of hind tarsal segment II extending beyond middle of segment IV ..... 4
- 3'. Setae present at least on inner surface of hind tibia; longest apical bristle of hind tarsal segment II not extending beyond middle of segment IV ..... 5
4. Metanotal-metepimeral suture extending at most halfway to dorso-posterior angle of metepisternum but continuing as faint line; acetabular seta arising below middle of caudal margin of fixed process, about  $\frac{2}{3}$  distance from its apex; upper spine of genal comb slightly wider and about  $\frac{3}{4}$  length of its lower neighbor ..... *dolomydis*

In *R. dolomydis* the sclerotized metanotal ridge is absent and the metasternum bears two setae. The spines of the genal comb are sharp, though not as much so as in *R. mesoides*. The pronotal comb contains 21-24 pointed spines. The labial palpi are five-segmented and extend about  $\frac{3}{4}$  the length of the fore coxa. St. VIII of the male bears a distinct caudal lobe subtended by a shallow sinus, and a row of 3-4 setae. The caudal margin of the fixed process is straight to slightly concave and st. IX is blunt, rounded and with a caudo-apical lobe.

- 4'. Metanotal-metepimeral suture extending at most halfway to dorso-posterior angle of the metepisternum, not continuing as faint line; acetabular seta arising in middle of caudal margin of fixed process, about half distance from its apex; upper spine of

genal comb slightly wider and about  $\frac{5}{8}$  length of its lower neighbor ..... *bureschi*

The internal sclerotized metanotal ridge is absent in *R. bureschi* and the metasternum bears two setae. The spines of the genal comb are much less pointed than in *R. dolomydis*. The pronotal comb contains 21 spines in the only known specimen. The labial palpi are five-segmented and, by implication in the literature, do not extend more than approximately  $\frac{2}{3}$  the length of the fore coxa. St. VIII of the male bears a pronounced caudal lobe subtended by a shallow sinus and a row of 4-5 setae. The caudal margin of the fixed process is convex and st. IX is blunt, rounded and with a caudo-apical lobe.

5. Two or three setae present on inner surface of hind tibia; acetabular seta arising below lowest articulation of movable process with fixed process; longest apical bristle of hind tarsal segment II extending about to middle of segment IV ..... *pilosa*

Information is not available for *R. pilosa* concerning the degree of development of the internal sclerotized ridge of the metanotum, the number of setae on the metasternum or the development of the metanotal-metepimeral suture. There are reported to be one or two setae on the inner surface of the hind femur in addition to those of the tibia. There are five spines in the genal comb. The upper spine is slightly wider and about  $\frac{2}{3}$  the length of its lower neighbor. The pronotal comb consists of 22-25 spines. St. VIII of the male possesses a gently rounded ventro-caudal angle but the caudal margin is straight and without a conspicuous lobe. The caudal margin of the fixed process is relatively straight with a slight convexity in its upper  $\frac{1}{2}$ . St. IX is blunt and rounded apically with a caudo-apical lobe.

5. One seta present on inner surface of hind tibia; acetabular seta arising at or above lowest articulation of movable process with fixed process, or absent entirely; longest apical bristle of hind tarsal segment II not reaching middle of segment IV ..... 6
6. Acetabular bristle absent; genal comb of five spines which are rounded apically, upper spine wider and extending about  $\frac{5}{8}$  length of its lower neighbor; longest apical bristle of hind tarsal segment II extending about  $\frac{1}{4}$  length of IV ... *hoogstraali*

In *R. hoogstraali* the internal sclerotization of the metanotal ridge is absent, the metasternum bears two setae and the metanotal-metepimeral suture extends only about halfway to the dorso-posterior angle of the metepisternum but continues as a faint line. One seta is present on the inner surface of both the femur and the tibia. There are twenty-one spines in the

pronotal comb. The labial palpus consists of five segments, extending about  $\frac{2}{3}$  the length of the fore coxa. The caudal margin of the fixed process is distinctly convex. St. VIII of the male bears a pronounced caudal lobe. St. IX is blunt, rounded apically and with a caudo-apical lobe.

- 6'. Acetabular seta present; genal comb of five spines which are pointed apically; upper spine wider and extending about  $\frac{2}{3}$  length of its lower neighbor; longest apical bristle of hind tarsal segment II extending only just beyond tip of segment III .... 7
7. Pronotal comb of 21 spines; acetabular bristle arising at level of lower articulation of movable process with fixed process; metanotal-metepimeral suture extending no more than halfway to dorso-posterior angle of metepisternum and not continuing as a faint line; st. VIII of male without conspicuous caudal lobe; t. VIII with a bristle just below spiracle ..... *sobrina*

The internal sclerotization of the metanotal ridge is absent in *R. sobrina* and there are one or two setae on the metasternum. (Peus, 1958, in his description of this species figures the metasternum with a single seta. The illustration in Hopkins and Rothschild, 1962, shows it with two.) There is one seta on the inner surface of the hind tibia. The caudal margin of the movable process is only slightly convex, practically straight. St. IX is blunt, rounded apically and bears a caudo-apical lobe.

- 7'. Pronotal comb of 23 spines; acetabular bristle arising above level of lower articulation of movable process, about  $\frac{3}{4}$  down from apex; metanotal-metepimeral suture extending about halfway to dorso-posterior angle of metepisternum but continuing as faint line; st. VIII of male with more or less conspicuous apical lobe below shallow sinus; t. VIII without bristles .... *strouhali*

The internal sclerotized ridge of the metanotum is absent in *R. strouhali* and there are two setae on the metasternum. There is one seta on the inner surface of the hind tibia. The caudal margin of the fixed process is distinctly convex in its apical  $\frac{2}{3}$  but bears a shallow sinus at about the level of the acetabular seta. St. IX is blunt, rounded apically and with a caudo-apical lobe.

#### LITERATURE CITED

- HOPKINS, G. H. E. AND M. ROTHSCHILD. 1962. An illustrated catalogue of the Rothschild collection of fleas (Siphonaptera) in the British Museum (Natural History). III. Hystrichopsyllidae. London, British Museum (Nat. Hist.), 560 pp, 1 map, 1049 Figs.
- IOFF, I. G., M. A. MIKULIN AND O. I. SCALON. 1965. Handbook of the fleas of Central Asia and Kazakhstan. Medizina, Moscow, 370 pp, 526 Figs. (in Russian).

- IOFF, I. G. AND O. I. SCALON. 1954. Handbook for the identification of the fleas of Eastern Siberia, the Far East and adjacent regions. Medgiz, Moscow, 275 pp, 353 Figs. (in Russian).
- IOFF, I. G. AND V. E. TIFLOV. 1950. Materials for the study of fleas. V. Genus *Rhadinopsylla* J. and R. Ectoparasites, 2: 44-73 (in Russian).
- PEUS, F. 1958. Flöhe aus dem Mittelmeergebiet (Ins., Siphonapt.) II. Griechenland. Mitt. zool. Mus. Berlin, 34(1): 136-171.
- SMIT, F. G. A. M. 1957a. New hystrihopsyllid Siphonaptera. Bull. Brit. Mus. (Nat. Hist.), Entomol., 6(2): 39-76, 75 figs.
- SMIT, F. G. A. M. 1957b. Fleas of *Dolomys*, the Yugoslavian mountain vole. Ann. Mag. Nat. Hist., ser. 12, 10: 305-319.

